AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listing, of claims in the application:

Claims 1-28 (cancelled)

Claim 29 (currently amended): A method of controlling a catalytic combustion system comprising a flame burner, a fuel injector positioned downstream of the flame burner and a catalyst positioned downstream of the fuel injector, wherein a portion of the fuel combusts within the catalyst and the remainder of the fuel combusts in the region downstream of the catalyst in a homogeneous combustion process wave comprising: positioning a sensor to monitor the region downstream of the catalyst, the sensor having an output signal responsive to the location of the homogeneous combustion process wave; and using the sensor signal to adjust [[the]] a catalyst inlet gas temperature to control the position of the homogeneous combustion process wave.

Claim 30 (original): The method of claim 29, wherein using the sensor signal to adjust catalyst inlet gas temperature comprises: adjusting the catalyst inlet gas temperature based upon a predetermined schedule between the measured exhaust gas temperature and the calculated exhaust gas temperature at full load; and modifying the predetermined schedule based upon the sensor signal.

Claim 31 (original): The method of claim 29, wherein using the sensor signal to adjust catalyst inlet gas temperature comprises: adjusting the catalyst inlet gas temperature based upon a predetermined schedule between the fuel air ratio and the catalyst inlet gas temperature; and modifying the predetermined schedule based upon the sensor signal.

Claim 32 (original): The method of claim 29, wherein using the sensor signal to adjust catalyst inlet gas temperature comprises: adjusting the catalyst inlet gas temperature based upon a

predetermined schedule between the adiabatic combustion temperature and the catalyst inlet gas temperature; and modifying the predetermined schedule based upon the sensor signal.

Claim 33 (original): The method of claim 29, wherein using the sensor signal to adjust catalyst inlet gas temperature comprises: adjusting the catalyst inlet gas temperature based upon a predetermined series of schedules between the adiabatic combustion temperature and the catalyst inlet gas temperature; and selecting the predetermined schedule from among the series of schedules based upon the sensor signal.

Claim 34 (original): The method of claim 29, wherein using the sensor signal to adjust catalyst inlet gas temperature comprises: adjusting the catalyst inlet gas temperature based upon a predetermined schedule between the fuel air ratio and the catalyst inlet gas temperature; and modifying the predetermined schedule based upon the sensor signal.

Claim 35 (original): The method of claim 29, wherein using the sensor signal to adjust catalyst inlet gas temperature comprises: adjusting the catalyst inlet gas temperature based upon a predetermined series of schedules between the fuel air ratio and the catalyst inlet gas temperature; and selecting the predetermined schedule from among the series of schedules based upon the sensor signal.

Claim 36 (original): The method of claim 29, wherein using the sensor signal to adjust catalyst inlet gas temperature comprises: adjusting the catalyst inlet gas temperature based upon a predetermined schedule that relates the difference between: (i)the measured exhaust gas temperature and the calculated exhaust gas temperature at full load, and (ii)the catalyst inlet gas temperature; and modifying the predetermined schedule based upon the sensor signal.

Claim 37 (original): The method of claim 29, wherein using the sensor signal to adjust catalyst inlet gas temperature comprises: adjusting the catalyst inlet gas temperature based upon a predetermined series of schedules that relates: (i) the difference between the measured exhaust gas

temperature and the calculated exhaust gas temperature at full load, and (ii)the catalyst inlet gas temperature; and selecting the predetermined schedule from among the series of schedules based upon the sensor signal.

Claim 38 (original): The method of claim 29, in which the sensor is an optical sensor that is sensitive in the radiation spectral region of 100 to 1000 nanometers wavelength.

Claim 39 (original): The method of claim 29, in which the sensor is an optical sensor that is sensitive in the radiation spectral region of 200 to 400 nanometers wavelength.

Claim 40 (original): The method of claim 29, in which the sensor is a charged ion sensor.

Claim 41 (original): The method of claim 29, in which the sensor is a temperature sensor in the gas downstream of the catalyst.

Claim 42 (original): The method of claim 29, in which the sensor is located on the wall of the post catalyst reaction zone chamber.

Claim 43 (original): The method of claim 29, wherein gas is extracted from the region downstream of the catalyst and the sensor measures the temperature of the extracted gas.

Claim 44 (original): The method of claim 29, wherein gas is extracted from the region downstream of the catalyst and the sensor measures the concentration of carbon monoxide or uncombusted fuel in the extracted gas.

Claim 45 (original): The method of claim 29, in which the sensor comprises a carbon monoxide or hydrocarbon sensor at the exhaust of the combustion process and position of the

homogeneous combustion process wave is determined from the measured concentration of carbon monoxide or hydrocarbons.

Claim 46 (original): The method of claim 29, wherein the gas temperature at the catalyst inlet is adjusted by changing the fuel flow to the flame burner.

Claim 47 (original): The method of claim 29, wherein the gas temperature at the catalyst inlet is adjusted by changing the percentages of fuel split between the flame burner and the injector.

Claims 48-50 (cancelled)

Claim 51 (currently amended): A system for controlling a catalytic combustion system, comprising: a flame burner; a fuel injector positioned downstream of the flame burner; a catalyst positioned downstream of the fuel injector, wherein a portion of the fuel combusts within the catalyst and the remainder of the fuel combusts in the region downstream of the catalyst in a homogeneous combustion process wave; a sensor positioned to monitor the region downstream of the catalyst, the sensor having an output signal responsive to the location of the homogeneous combustion process wave; and a system for using the sensor signal to adjust [[the]] a catalyst inlet gas temperature to control the position of the homogeneous combustion process wave.

Claim 52 (original): The system of claim 51, wherein the system for using the sensor signal to adjust the catalyst inlet gas temperature comprises: a system for adjusting the catalyst inlet gas temperature based upon a predetermined schedule between the measured exhaust gas temperature and the calculated exhaust gas temperature at full load; and a system for modifying the predetermined schedule based upon the sensor signal.

Claim 53 (original): The system of claim 52, wherein the system for using the sensor signal to adjust the catalyst inlet gas temperature comprises: a system for adjusting the catalyst inlet gas temperature based upon a predetermined schedule between the fuel air ratio and the catalyst

inlet gas temperature; and a system for modifying the predetermined schedule based upon the sensor signal.

Claim 54 (original): The system of claim 52, wherein the system for using the sensor signal to adjust the catalyst inlet gas temperature comprises: a system for adjusting the catalyst inlet gas temperature based upon a predetermined schedule between the adiabatic combustion temperature and the catalyst inlet gas temperature; and a system for modifying the predetermined schedule based upon the sensor signal.

Claim 55 (original): The system of claim 52, wherein the system for using the sensor signal to adjust the catalyst inlet gas temperature comprises: a system for adjusting the catalyst inlet gas temperature based upon a predetermined schedule between the fuel air ratio and the catalyst inlet gas temperature; and a system for modifying the predetermined schedule based upon the sensor signal.

Claim 56 (original): The system of claim 52, wherein the system for using the sensor signal to adjust the catalyst inlet gas temperature comprises: a system for adjusting the catalyst inlet gas temperature based upon a predetermined schedule that relates the difference between: (i)the measured exhaust gas temperature and the calculated exhaust gas temperature at full load, and (ii)the catalyst inlet gas temperature; and a system for modifying the predetermined schedule based upon the sensor signal.

Claim 57 (original): The system of claim 52, wherein the sensor is an optical sensor that is sensitive in the radiation spectral region of 100 to 1000 nanometers wavelength.

Claim 58 (original): The system of claim 52, wherein the sensor is an optical sensor that is sensitive in the radiation spectral region of 200 to 400 nanometers wavelength.

Claim 59 (original): The system of claim 52, wherein the sensor is a charged ion sensor.

Claim 60 (original): The system of claim 52, wherein the sensor is a temperature sensor in the gas downstream of the catalyst.

Claim 61 (original): The system of claim 52, wherein the sensor is located on the wall of the post catalyst reaction zone chamber.

Claim 62 (original): The system of claim 52, further comprising: a system for extracting gas from a region downstream of the catalyst, wherein the sensor measures the temperature of the extracted gas.

Claim 63 (original): The system of claim 52, further comprising: a system for extracting gas from a region downstream of the catalyst, wherein the sensor measures the concentration of carbon monoxide or uncombusted fuel in the extracted gas.

Claim 64 (original): The system of claim 52, wherein the sensor comprises a carbon monoxide or hydrocarbon sensor at the exhaust of the combustion process and position of the homogeneous combustion process wave is determined from the measured concentration of carbon monoxide or hydrocarbons.

Claims 65-74 (cancelled)